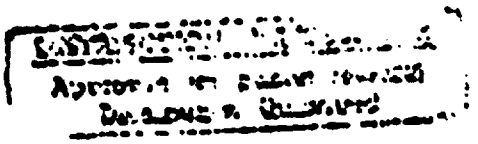
ENERGY ENGINEERING ANALYSIS PROGRAM
STUDY REPORT

EXECUTIVE SUMMARY
FINAL REPORT

ANNISTON ARMY DEPOT
ANNISTON, ALABAMA



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CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
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EXECUTIVE SUMMARY

This is a summary of the Energy Engineering Analysis performed for the Anniston Army Depot (ANAD) in Anniston, Alabama. It includes recommendations to be considered in the development of a Basewide Energy Plan, consisting of energy conservation projects and other recommendations for reduction of the installation's 1985 source energy consumption.

Anniston Army Depot is located in Northeastern Alabama, approximately 10 miles west of the City of Anniston. The Depot is the largest combat vehicle rebuilding facility in the free world. The eastern part of the property is gently rolling land, while the western part is hilly with some steep slopes. The Coosa River Storage Annex is operated as part of the Depot, with land ranging from gently rolling to mountainous.

This summary presents data on:

- Historical and predicted energy consumption
- Energy conservation procedures for distribution systems
- Energy conservation procedures for buildings and processes
- Utilization of energy monitoring and control systems (EMCS)
- Utilization of wood biomass and waste fuels
- Cogeneration and Replacement Boilers

The conservation of energy in existing facilities can be accomplished in the following two ways:

- Reduce the basic system energy requirements and source energy use
- Recover energy discharged from one user and utilize this waste energy for other purposes

A reduction in system energy requirements is represented by such activities as lowering equipment operating temperatures, reduction of transmission losses by better insulation, and night/weekend setback or shutdown of energy users and associated distribution systems.

Recovery of energy discharged by one user and utilization of this waste energy for other purposes is demonstrated by such activities as returning condensate to boiler systems and recovery of heat from process exhaust air systems to preheat replacement air. Examples of energy below the level of practical utilization are exhaust flue gases from boilers (cooled to near the dew point), and air exhausted from buildings near ambient temperature conditions.

This study has been directed towards identifying means of energy conservation conforming to those two methods identified as reduction in overall use and recovery of waste energy. Although the above discussion may appear to be confined to heat energy, investigations covered electrical usage, water usage, compressed air, wood biomass and solar energy.

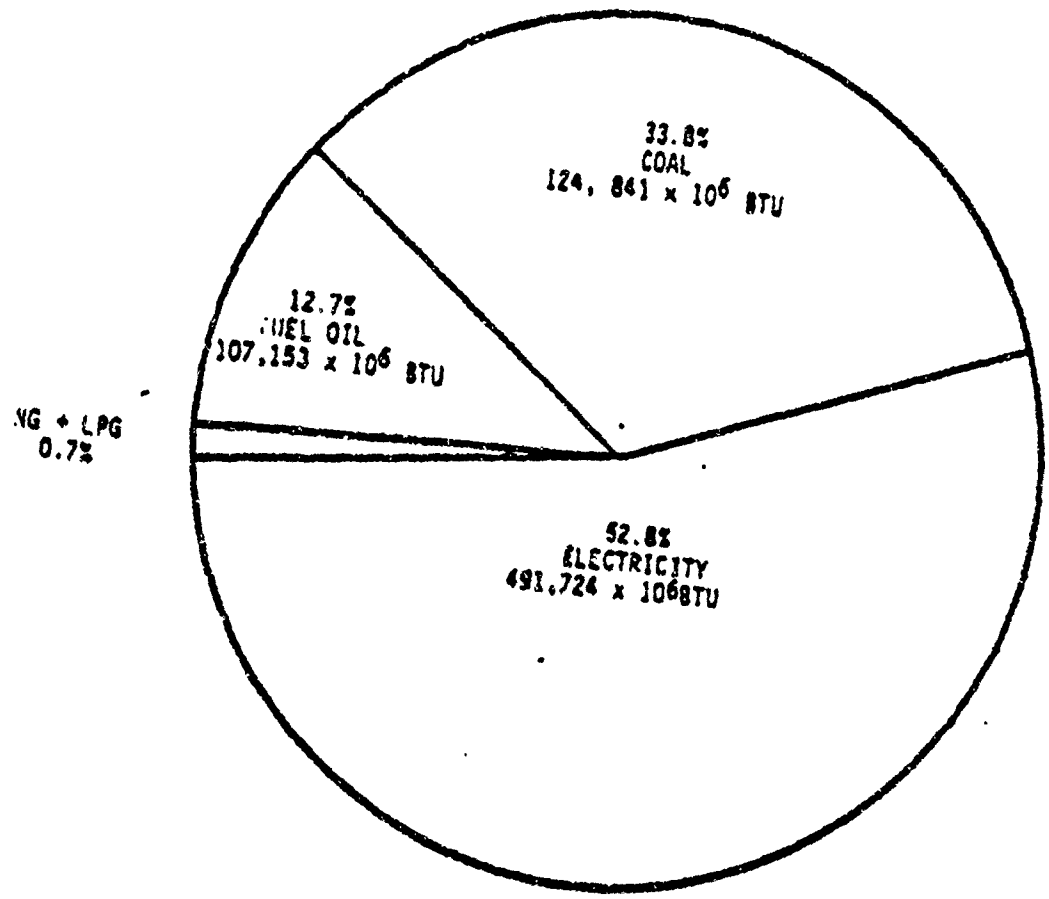
The number and type of viable ECIP funded projects has been restricted by direction of the COE, Mobile to those which qualify at an Energy/Cost ratio of 1.3 or greater for fiscal year 1985, and which exceed a Capital Cost Value of $100,000. The total energy savings presented in this report can be obtained only upon full implementation of the viable ECIP projects, compliance with the recommended conservation measures requiring capital investments less than $100,000, and those measures requiring policy changes at the management level.

Computer simulations of building energy use were modeled using the DOE-2.1 program. Computer simulations for energy utilization were performed on typical building types. Categorizing and prototyping methodology followed procedures outlined in the Black & Veatch Study "Engineering Instructions for Preparation of a Basewide Energy Systems Plan", dated January 1980. After careful examination of the ANAD facilities during field surveys, taking into consideration the building construction, building functions, and plant operating procedures, a total of 13 typical buildings were computer modeled to determine their energy use, both thermal and electrical, and to verify recorded historical energy consumption figures during the base year 1975. The final analysis resulted in a correlation which was within 2 percent of recorded consumption figures.

Energy conservation projects were generated from the energy model for conservation measures involving building insulation, reduction in fenestration area, temperature controls installation, relighting with energy-efficient fixtures, and a basewide EMCS. A detailed analysis is provided in the main report.

The following is a tabulation of the ANAD source energy consumption for the fiscal year ending September 1980.

Electricity	491,724 x 10^6 BTU
Fuel Oil No. 2	118,343 x 10^6 BTU
Coal	314,058 x 10^6 BTU
Natural Gas	78.6 x 10^6 BTU
LPG	4,279.8 x 10^6 BTU
Total	930,480 Mega BTU



BASEWIDE CONSUMPTION FY-80
TOTAL 930,480 x 10⁶ BTU

FIGURE 1

This yields a total of 930,480 Mega BTU's for FY-80 (see Figure 1). It is reported that operations during this period were at the normal production level for this facility.

Figure 2 shows the historical and predicted annual energy consumption for a ten-year period through fiscal year 1986, reflecting the effect of proposed conservation measures.

It was determined that the fuel consumption rate for this facility is partially weather-dependent. Since about 43% of the steam generated in the boilers is consumed in process operations, the remainder is therefore consumed in building heating and transmission line losses getting the steam to the buildings. Figure 3 shows the monthly fuel consumption for fiscal year 1980. Note the peaks during the cold winter months.

Figure 4 shows the basewide electrical consumption for the past three fiscal years. Recent annual consumption shows a slight decline due to the shaving of peaks in cold winter months, while the average yearly consumption remains relatively constant between 42 and 43 million kilowatt hours. It is apparent the peaks have been reduced as a result of an Executive Order prohibiting supplemental electrical heating units where a building already contains a main source of heat.

Production levels in the near future can be expected to remain the same as for fiscal year 1980. Therefore, assuming similar weather conditions for the Anniston Area, future fuel consumption on a short term basis should remain relatively constant.

PROJECTED ENERGY CONSUMPTION
ANNISTON ARMY DEPOT
BASEWIDE FUEL & ELECTRIC

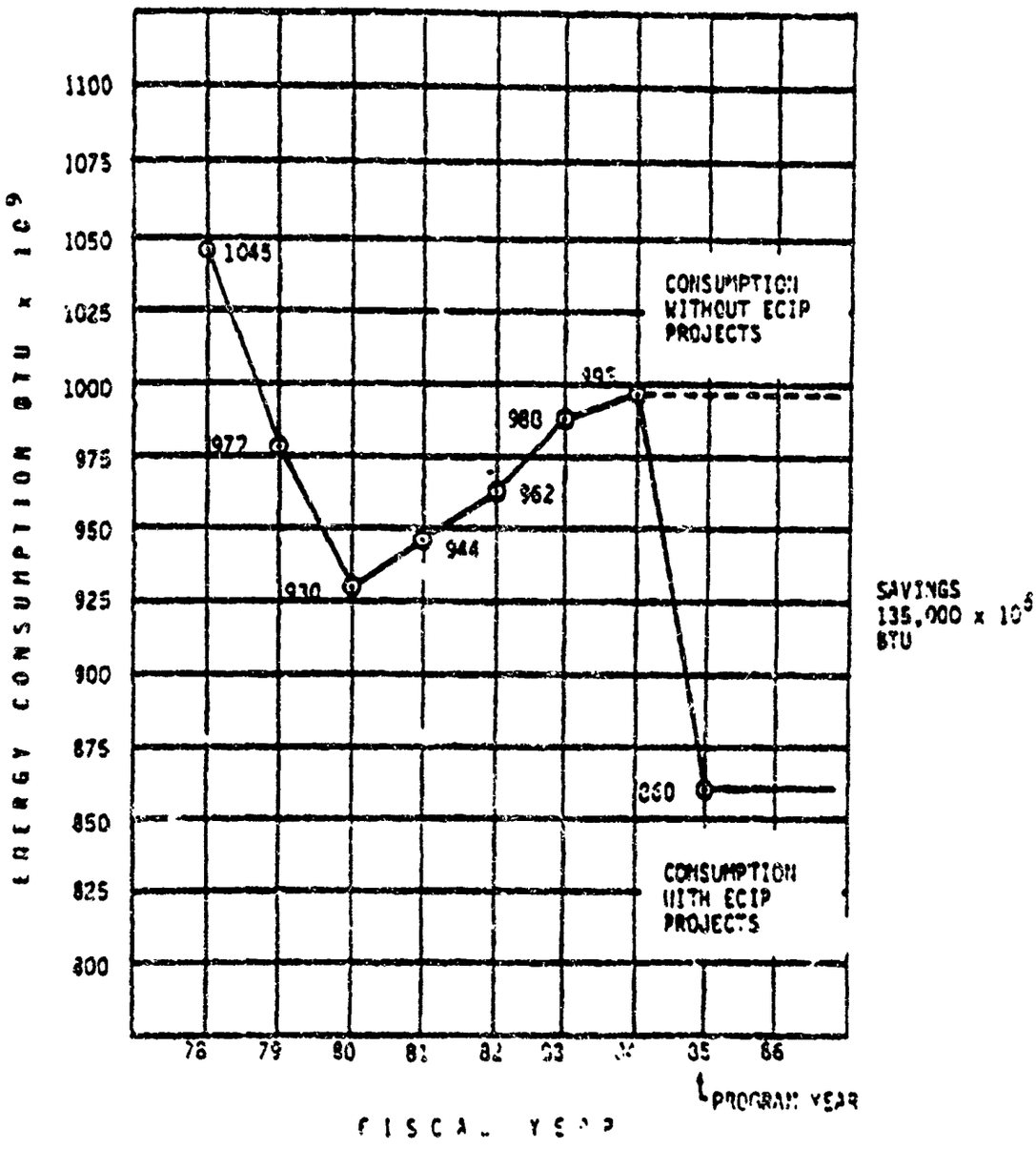


FIGURE 2
ES-6

BASEWIDE FUEL CONSUMPTION
ANNISTON ARMY DEPOT FY-80

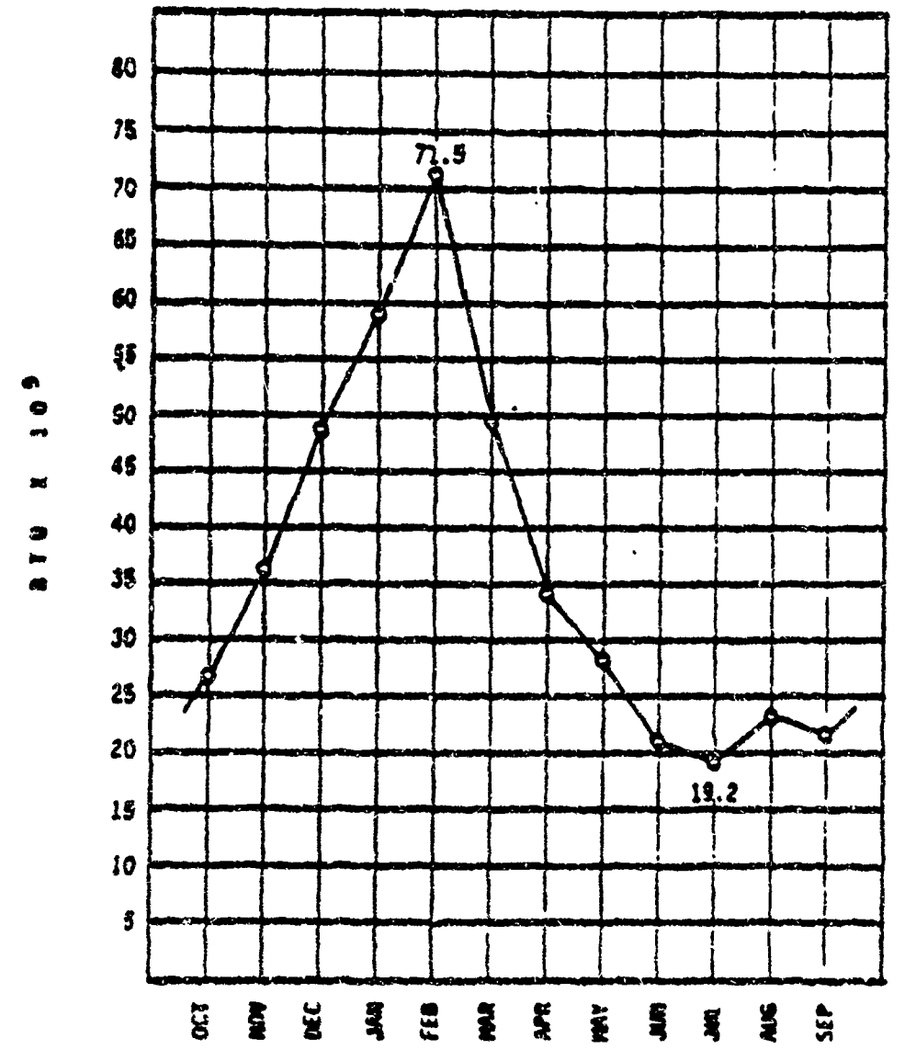


FIGURE 3

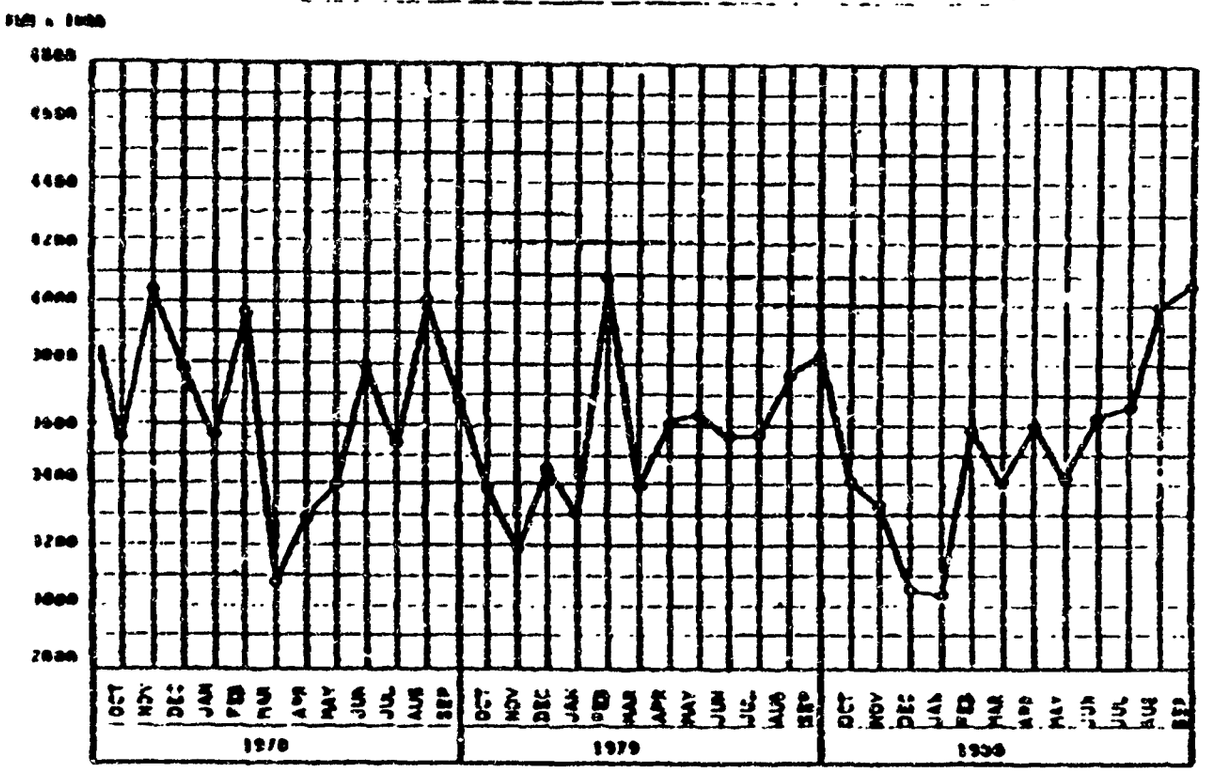

ANNISTON ARMY DEPOT ELECTRICAL LOAD
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
1978
1979
1980

FIGURE 6

The projected basewide energy costs through fiscal year 1986 are shown on Figure 5. Projections are made for the facility if operated in its 1980 mode plus proposed steam load increases. Predicted costs resulting from the anticipated energy savings from implementation of all energy conservation projects and recommendations in FY-85 are shown by the solid line graph. The following escalation rates were used for calculation purposes:

Fuel Oil:	1.14 (14%)
Coal:	1.10 (10%)
Electricity:	1.13 (13%)

A total of 13.6% or 135,000 Mega BTU can be saved annually upon implementation of all viable ECIP projects and energy conservation recommendations determined by this study. Figure 6 shows the total source energy reduction. Further breakdown of the total savings yields the following:

Fuel Oil:	$5,290 \times 10^6$ BTU saved
Coal:	$30,290 \times 10^6$ BTU saved
Electricity:	$99,200 \times 10^6$ BTU saved

Projects for source energy reduction are listed in Table 1 with their corresponding S/C ratio. Table A-1 contains projects not qualifying for ECIP funding, requiring less than $100,000 capital expenditure, but which are considered to be good energy-saving measures. (See Appendix A of this summary.)

PROJECTED ENERGY COSTS
FUEL & ELECTRICITY
ANNISTON ARMY DEPOT

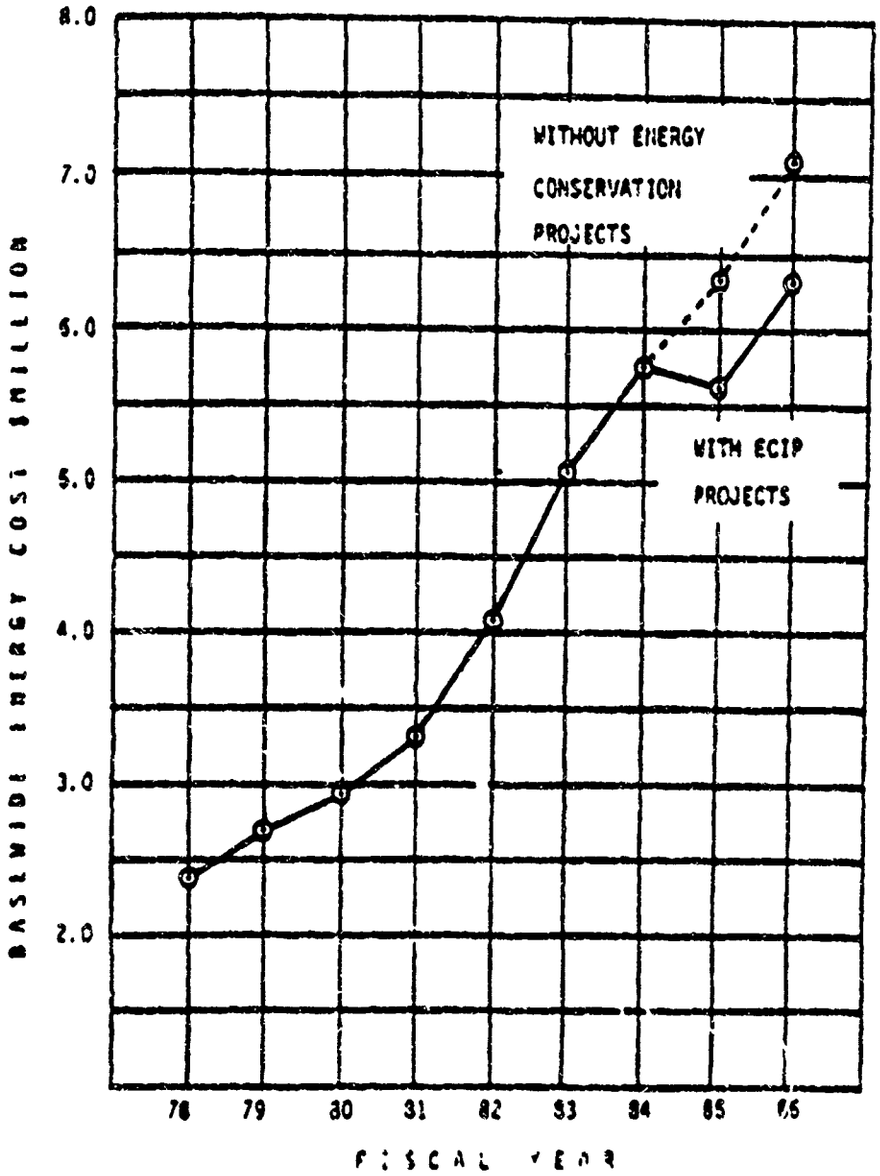
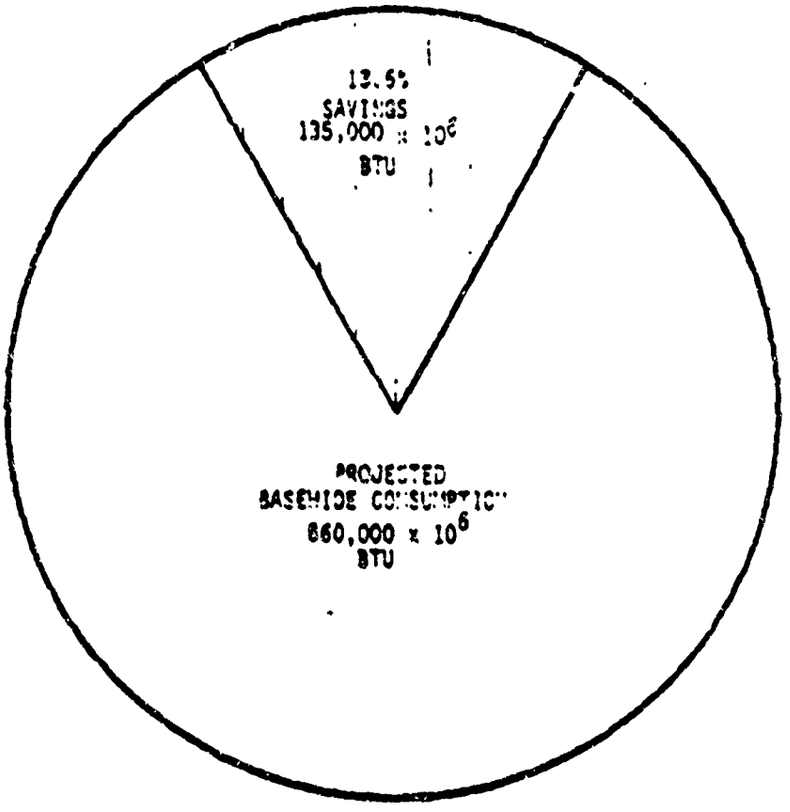


FIGURE 3



BASEWIDE ENERGY CONSUMPTION
FY-85
AFTER ECIP PROJECTS

FIGURE 6

Further explanation of the historical energy consumption, basewide energy model, and energy conservation analysis can be found in the Energy Use Survey. The analysis for control schemes and basewide EMCS applications is included in the report on Energy Monitoring and Control Systems.

The composite total in energy reduction for building improvement projects is not a simple algebraic summation of individual project's energy savings. Due to synergistic effects, the composite total savings are approximately 85% of the simple sum. Consideration must be given to these synergistic effects when arriving at energy savings using different combinations of energy conservation projects.

The addition of simple temperature controls or the installation of a basewide EMCS essentially accounts for the same block of energy to be saved. One or the other must be chosen, and thus the energy savings can only be taken credit for one time. Although the initial cost is greater to install the EMCS, it does have a decided advantage over the simpler temperature controls arrangement due to its inherent ability to monitor and report out of state operating conditions. This discourages tampering by personnel and ultimately guarantees energy savings, provided the system is properly installed and maintained.

ECIP PROJECT SUMMARY

ANNISTON ARMY DEPOT

PROJECT TITLE	PROJECT NUMBER	COST $1000	ENERGY SAVED MEGA BTU ELEC.	OIL	COAL	B/C	E/C	PB YEARS
Temperature Controls - 83 Buildings	M-204	325.9	8008.1	3790.2	15276.1	5.34	87.5	1.98
Upgrade District Steam Insulation - East End	A-10	209.9	-	-	11600	1.1	61.3	4.1
Relight 61 Buildings	M-206	2079.2	77263.6	-	-	2.9	79.0	3.8
Decrease Windows 51 Buildings	M-203	374.1	4652.3	2437.7	6008.6	3.65	38.4	4.27
Renovate EMCS - 83 Buildings	M-205	1185.1	8008.1	3790.2	15376.1	1.20	24.0	10.0
Install (2) Regenerative Dynamometers	A-3	851.1	11207	-	-	1.01	14.5	10.2

TABLE 1

A detailed study of the utilization of Biomass material from the 14,000 acre Anniston Site as an energy source was conducted. This study indicated that it would take 20 to 25 years to develop woodlands capable of maintaining a reasonably uniform level of Biomass material. However, there is opposition to increasing the amount of woodlands at ANAD for security reasons which prevents production of enough wood capable of generating the steam required by this facility.

At present, wood biomass would be a more expensive fuel than coal or oil at Anniston Army Depot. Due to the high moisture content of wood and handling expenses, the cost of burning wood grown on site would be about 1.7 times that of coal per BTU equivalent.

However, since there already exists a Forestry Program which involves the regular removal of timber, any wood which is not of sawtimber quality may be utilized in the following ways:

- used as a fuel at ANAD
- sold to pulp mills
- separated, using the low quality wood for fuel at Anniston and selling the high quality wood to pulp mills.

A complete analysis on the burning of wood materials is presented in the Biomass Survey section of the report.

An analysis was performed for the application of central boiler plants as a method of meeting the projected growth in steam demand as established in the ANAD Master Plan. It was determined that under present levels of summer steam demand, the installation of

cogeneration equipment was not economical, making a life cycle cost analysis (LCC) of this alternative a meaningless calculation. The final recommendations suggest the installation of new coal fired steam generators at a location in the east end of the depot. We recommend the installation of (3) - 30,000 lbs./hr. boilers, one at a time, at convenient intervals based on anticipated steam demand increases from the present time through the year 1988. Details of the study are presented in the section on Central Boiler Plants.

APPENDIX A

POTENTIAL CONSERVATION MEASURES

TABLE A-1

POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT

	Project Studied	Comments
1.	Insulate walls of chemical cleaning tanks	Good Project
2.	Install retractable covers on chemical cleaning tanks	Good Project
3.	Install boiler economizers, oxygen trim controls, blowdown heat reclaim devices, etc.	Viable for process loads; short heating season does not justify capital cost of retrofit
4.	Reset outside air dampers to minimum requirements of ASHRAE 62-73	Good project; very limited application
5.	Add floor, ceiling, and wall insulation	This is a viable project for specific buildings only
6.	Install storm windows	Limited applications to non-industrial structures
7.	Install solar shading devices: - Solar window film - Solar screens - Overhangs - Awnings	Solar energy currently provides assistance to building heating in some buildings with significant window area
8.	Weatherstrip doors	Limited applications to non-industrial structures
9.	Install vestibules around high traffic doors	This project has limited application due to size of vehicles
10.	Install setback temperature controls	Good Project
11.	Install regenerative engine	Good Project
12.	Reduce glass area by adding insulated panels	Good Project

POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

	Project Studied	Comments
13.	Install flue dampers, smaller jets, dual burners, electronic ignition, etc. in small furnaces	Short heating season does not justify capital cost of retrofit
14.	Replace manual control valves or install temperature regulators in cast-iron radiators	Not cost effective where central controls are recommended
15.	Replace existing coal boilers with gas/oil conversion kits with modern packaged boilers	This project does not meet the criteria
16.	Replace incandescent lighting with higher efficiency lighting systems	Good Project
17.	Install photocell lighting controls	This project has limited application
18.	Replace existing motors with motors of the high efficiency type	There is an engineering disagreement concerning this project particularly where large older motors are involved
19.	Reduce lighting levels to minimum standards	Limited application - many facilities are below minimum standards
20.	Install water closet tank inserts, flow reducing shower heads, or other water conserving devices to reduce pumping energy consumption	Limited Application
21.	Insulate existing steam lines	Good Project
22.	Revise existing chilled water/ hot water pumping schemes to more efficient methods	N/A
23.	Deactivate individual room thermostats in barracks and install temperature reset controls on chilled and hot water	N/A
24.	Shut down steam plants in the summer and satisfy process steam needs with electric boilers	N/A

POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

	Project Studied	Comments
25.	Install infrared heating in warehouses, hangars, and shops	This project does not meet the criteria due to short heating duty cycles
26.	Install economizer systems for "free cooling" in intermediate seasons	This project does not meet the criteria in retrofit applications
27.	Modify multizone systems to include hot/cold deck reset	N/A
28.	Modify cooling tower systems to cycle fan with load and/or install bypass valving	N/A
29.	Install load-shedding system to minimize demand charges	N/A
30.	Correct power factor	This project does not meet the criteria
31.	Install chilled and hot water reset controls	N/A
32.	Install FM radio control system	N/A
33.	Replace existing windows with insulating panels	Very limited application
34.	Insulate temporary buildings	N/A
35.	Upgrade electrical distribution voltage	N/A
36.	Install total or selective energy plants	This project does not meet the criteria
37.	Install energy monitoring and control system (EMCS)	Good Project
38.	Install heat reclaim devices on air-cooled condensers	Limited Application
39.	Replace remotely located absorption chillers with more efficient electric-driven chillers	N/A
40.	Install solid waste-burning boilers	This project does not meet the criteria

POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

Project Studied	Comments
41. Install trailer enclosing devices at loading docks	This project has limited additional application
42. Install solar energy systems where feasible	This project does not meet the criteria
43. Install air-to-air heat reclaim devices in high exhaust areas, such as seashell kitchens	This project does not meet the criteria

TABLE A-2

POTENTIAL CONSERVATION MEASURES REQUIRING POLICY CHANGES
AT INSTALLATION LEVEL

	Project Studied	Comments
1.	Replace domestic water heaters with higher efficiency models as replacement is required.	Good Project
2.	Shut down steam boilers and branch lines in summer	Currently Practiced
3.	Reduce domestic hot water temperatures from 140°F to 110-120°F	Good Project
4.	Replace electric motors with motors of the high efficiency type on replacement basis	Good project, limited application due to motor frame sizes of older equipment
5.	Use task lighting	Currently Practiced
6.	Install temporary 4-mil plastic storm windows	Good Project
7.	Shut down HVAC and DHW systems in unoccupied buildings	Currently Practiced
8.	Calk cracks on self-help basis	Good Project
9.	Install high-efficiency transformers on replacement basis	Good project - recommend replacement of all oversized transformers
10.	Enforce indoor space temperature regulations	Good Project
11.	Repair steam and condensate leaks	Good Project
12.	Repair air leakage in ducts	N/A
13.	Turn pilot lights for heating equipment off for the summer	Good project
14.	Replace air-conditioning units with high efficiency models as replacement is required	Good project

APPENDIX 3

BUILDING DATA

INDEX

APPENDIX B

TABLE 2

Prototype/Computer Simulated			
Category Code	AAD Bldg. No.	Function	Similar Buildings
A-1-E	7	Headquarters	None
A-1-E	53	Security	None
A-1-E W-1-E	362	Office Warehouse	None
A-1-M	1	Office	2, 75, 220, 221, S-15, S-16, S-47, S-48, S-49, S-74
A-1-O	103	General Purpose	106, 363 (Air Condition area only)
A-1-O	140	Administration	100, 141, 302
M-1-E	301	Tank Repair Shop	None
M-1-M	21	Shop	3, 4, 5, 8, 9, 10, 13, 22, 27, 28 46, 53
M-2-E	54	Shipping	58, 59, 65, 87, 88, 171, 172, 380, 381, 600, 632, 634, 638, 669, 670, 673, 675, 676, 677, 680, 688, S-84
M-1-O	129	Small Arms Shop	104, 111-113, 127, 128, 130
M-1-O	143	Tank Repair Shop	107, 108, 117, 144, 146, 147, 402, 411, 421, 503, S-142
M-1-O	400	Tank Repair Shop	None
M-1-O	409	Vehicle Maint. Shop	410, 433

TABLE 1

LEGEND

Category Code	Building Type	HVAC System
A-1-E	Administration	• Permanent Air Condition - Oil-fired individual heating plant
A-1-W	Office	• Permanent Air Condition - Coal-fired individual heating plant
A-1-C	Administration	• Permanent Air condition - Coal-fired central boiler plant
M-1-E	Maintenance/Production	• Permanent In-air condition - Oil-fired individual heating plant
M-1-W	Maintenance/Production	• Permanent In-air condition - Coal-fired individual heating plant
M-1-E	Maintenance/Production	• Permanent Partially Air Condition - Coal-fired individual heating plant
M-1-C	Maintenance/Production	• Permanent In-air condition - Coal-fired central boiler plant
W-1-E	Warehouse	• Permanent In-air condition - Oil-fired individual heating plant

TABLE 2

TYPICAL BUILDING ENERGY CONSUMPTION DATA

AAD

Group No.	Bldg.	Building Description	Annual Energy Source Consumption BTU x 10^6				Elec. Energy Consumption		Btu x 10^6 Sq. Ft.
			Fuel		Elec.	Total	KW Peak	KWH/Year	
			Coal	Oil					
A-1-H	7	Headquarters	-	2066.0	9,919.4	11,985.4	286.4	1,833,224	0.221
A-1-S	53	Security	-	568.3	7,186.8	7,695.1	262.9	663,371	0.257
A-1-E M-1-E	362	Office Warehouse	-	6861.6	16,987.8	23,849.4	488.7	2,055,983	0.090
A-1-N	1	Office	587.1	-	1,625.1	2,132.2	44.6	193,010	0.169
A-1-O	109	General Purpose	688.9	-	11,515.4	12,196.3	260.6	1,051,405	0.410
A-1-O	140	Administration	270.5	-	1,675.6	1,946.1	79.9	167,767	0.224
M-1-S	501	Tank Repair Shop	-	3129.8	2,730.3	5,864.8	103.7	595,586	0.096
M	31	Shop	896.1	-	4,385.3	5,281.8	62.3	455,293	0.322
M-2-M	54	Shipping	247.5	-	715.9	963.4	31.4	83,052	0.129
M-1-O	129	Small Arms Shop	3132.5	-	6,651.0	10,783.5	173.4	929,613	0.112
M-1-O	141	Tank Repair Shop	3122.3	-	3,398.7	6,520.9	138.7	562,147	0.071
M-1-O	488	Tank Repair Shop	7694.3	-	13,113.4	20,807.7	496.5	1,793,767	0.892
M-1-O	489	Vehicle Maint. Shop	926.8	-	1,454.3	3,378.1	55.1	305,895	0.043

TABLE 3

ANNISTON AD

AIR CHANGE RATES USED FOR INFILTRATION

BLDG. NO.	AS IS	INSUL. ROOF	INSUL. WALLS	REDUCE GLASS
1	3	"	"	2
7	1.5	"	"	"
21	4	3.5	3.5	3
53	3	"	"	2
84	4	"	3.5	3
104	4	"	3.5	"
105	1.5	"	"	"
129	3	2.5	2.5	2
140	3	"	"	2
143	7	6.5	6.5	6
362 (Office)	3	"	"	2
362(Warehse)	5	4.5	4.5	4
400	7	6.5	6.5	6
409	5	"	"	"
502	5	"	"	"

TABLE 5
ARD

TABULATION - MONTHLY THERMAL COMPUTER ANALYSIS OUTPUT (MBTU)
AS IS CONDITION

Bldg. No. East End	J	F	M	A	M	J	J	A	S	O	N	D	Total
104	218.1	217.2	165.6	5.5	0	0	0	0	0	11.2	33.5	127.6	778.5
105	169.5	177.4	134.5	19.1	0	0	0	0	0	21.5	41.9	116.6	680.9
129	597.7	597.4	453.8	15.0	0	0	0	0	0	30.7	98.6	349.0	2,132.5
140	70.6	67.1	57.7	5.5	0	0	0	0	0	7.0	16.8	46.0	270.5
180	837.9	812.2	613.1	28.9	0	0	0	0	0	78.6	162.0	589.7	3,122.3
400	2,124.6	2,068.3	1,564.5	62.4	0	0	0	0	0	152.9	361.1	1,380.5	7,694.3
469	261.7	254.8	195.5	2.4	0	0	0	0	0	8.9	29.7	161.8	924.8
Other East End Bldgs. 00,106,107,108, 11-115,117,127, 28,130,141,144, 46,147,402,410, 11,421,431,502, 03,5-182	4,938.3	4,867.0	3,715.3	159.1						337.9	853.7	3,118.5	17,990.6
TOTAL MBTU	9,218.6	9,040.1	6,899.1	297.9	0	0	0	0	0	648.7	1,600.3	5,889.7	33,594.4
oiler/Bldg.Eff.	65	60	55	50	-	-	-	-	-	50	60	65	Avg.60.6
BTU & Boiler	14,183	15,067	12,544	596	0	0	0	0	0	1,297	2,667	9,061	55,415
% Dev.	-19	-10	+274	-41	0	0	0	0	0	-29	-22	+17	15

ADJ. 6 YEAR AVERAGE - RECORDED DATA (From Exhibit I)

Boiler MBTU	17,413	16,689	8,568	1,018	0	0	0	0	0	1,832	3,415	7,734	52,669

ANNISTON ARMY DEPOT - East End | FUEL, Coal | BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	COMP WITH BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: PER FT² WALL	DECREASE WINDOWS 50%: GLASS AREA	DECREASE WINDOWS 50%: MEGA BTUS THERMAL	DECREASE WINDOWS 50%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 50%: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: PER FT² [illegible]
105	105													39732	969.7	2501.6	.0706
106	105													29317	521.5	1489.1	.0706
TOTAL														69049	1371.2	2000.9	N/A

REMARKS:

ANNISTON ARMY DEPOT - [illegible] FUEL: Coal BOILER EFFICIENCY: 60%

BLDG. NO.	COMP WITH BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: PER FT^2 ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: PER FT^2 WALL	DECREASE WINDOWS 50%: GLASS AREA	DECREASE WINDOWS 50%: MEGA BTUS THERMAL	DECREASE WINDOWS 50%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 50%: PER FT^2 GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: PER FT^2 FLOOR
129	129	100557	1110.5		.0110	20133	309.6		.0190					96330	301.5		.0015
[illegible]	129	100557	1110.5		.0110	20133	309.6		.0190					96330	301.5		.0015
[illegible]	129	100557	1110.5		.0110	20133	309.6		.0190					96330	301.5		.0015
[illegible]	129	100557	1110.5		.0110	20133	309.6		.0190					96330	301.5		.0015
[illegible]	122	36727	405.0		.0110	1363	26.0		.0190					[illegible]	122.2		.0015
[illegible]	129	14100	150.5		.0109	3000	57.5		.0189					13782	40.3		.0035
[illegible]	129	35551	391.6		.0109	7817	142.0		.0190					34653	119.8		.0015
[illegible]	129	35551	391.6		.0109	7817	142.0		.0190					34653	119.8		.0015
[illegible]	122	30391	334.0		.0110	10006	201.0		.0199					40260	146.0		.0036
115	129	2720	30.0		.0110	[illegible]	11.0		.0190					2609	9.2		.0035
TOTAL		537002	6109.5		N/A	115615	2290.7		N/A					535108	1954.0		N/A

REMARKS:

ANNISTON ARMY DEPOT - Roof End — FUEL: Coal — BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	[illegible]	ROOF AREA	ROOF INSULATION MEGA BTUS THERMAL	ROOF INSULATION MEGA BTUS ELECTRIC	ROOF INSULATION PER FT² ROOF	WALL INSULATION WALL AREA	WALL INSULATION MEGA BTUS THERMAL	WALL INSULATION MEGA BTUS ELECTRIC	WALL INSULATION PER FT² WALL	DECREASE WINDOWS 50% GLASS AREA	DECREASE WINDOWS 50% MEGA BTUS THERMAL	DECREASE WINDOWS 50% MEGA BTUS ELECTRIC	DECREASE WINDOWS 50% PER FT² GLASS	TEMPERATURE CONTROL FLOOR AREA	TEMPERATURE CONTROL MEGA BTUS THERMAL	TEMPERATURE CONTROL MEGA BTUS ELECTRIC	TEMPERATURE CONTROL PER FT² FLOOR
140	140									248	84.9	284.0	1.153	6705	75.0	266.6	.0197
160	145									215	74.3	876.7	1.167	7549	65.5	231.0	.0192
141	110									322	111.3	284.2	1.165	10298	95.0	345.3	.0192
587	140									162	55.6	133.9	1.145	3602	49.2	171.9	.0194
TOTAL										947	325.7	777.0	N/A	33227	287.7	1011.8	N/A

REMARKS:

ANNISTON ARMY DEPOT - East End — FUEL: Coal — BOILER EFFICIENCY: 50%

DECREASE IN MEGA BTUS

OLD BLDG NO.	GROUP BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: PER FT² WALL	DECREASE WINDOWS 50%: GLASS AREA	DECREASE WINDOWS 50%: MEGA BTUS THERMAL	DECREASE WINDOWS 50%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 50%: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: PER FT² FLOOR
140	141	95130	2021.3		.0212	55984	833.0		.0148	4370	*32.6		*.0131	91910	966.1		.0105
161	161	4491	20.6		.0260	2691	39.6		.0147	202	* 3.0		*.0160	4294	44.1		.0101
100	141	31653	660.1		.0200	18481	272.3		.0147	1628	*20.1		*.0148	30232	312.5		.0101
117	141	31653	660.1		.0200	18418	272.8		.0147	1418	*20.1		*.0141	30233	312.5		.0103
144	141	3539	73.8		.0218	205	30.5		.0960	130	* 2.2		*.0116	3380	35.0		.0100
146	141	27071	581.6		.0409	16212	239.5		.0147	1251	*17.0		*.0142	26530	275.6		.0103
147	140	14660	305.0		.0208	8533	136.0		.0147	658	* 9.3		*.0141	14010	144.6		.0101
402	101	5637	111.3		.0206	3161	46.6		.0147	266	* 3.5		*.0141	5191	53.6		.0101
411	141	10551	222.6		.0398	6217	90.6		.0147	474	* 6.6		*.0140	10077	104.2		.0103
421	141	15077	316.5		.0208	8770	128.6		.0147	677	* 9.3		*.0140	14000	140.0		.0101
401	141	6151	130.2		.0300	3603	53.3		.0148	278	* 3.8		*.0137	5916	61.2		.0101
S-142	141	35278	735.6		.0200	20520	301.2		.0147	1500	*22.5		*.0142	33696	340.2		.0101
TOTAL		281568	5918.9		N/A	166814	2438.9		N/A	N/A	N/A		N/A	269955	2805.2		N/A

REMARKS. * Indicates increase in MEGA BTUS and is not included in Project N-303.

ANNISTON ARMY DEPOT - East End FUEL: Coal BOILER EFFICIENCY: 68%

DECREASE IN MEGA BTUS

BLDG. NO.	COMP FROM BLDG	ROOF INSULATION				WALL INSULATION				REPLACE WINDOWS 50%				TEMPERATURE CONTROL			
		ROOF AREA	MEGA BTUS			WALL AREA	MEGA BTUS			GLASS AREA	MEGA BTUS			FLOOR AREA	MEGA BTUS		
			THERMAL	ELECTRIC	PER FT² ROOF		THERMAL	ELECTRIC	PER FT² WALL		THERMAL	ELECTRIC	PER FT² GLASS		THERMAL	ELECTRIC	PER FT² FLOOR
100	300	226660	2710.3		.0288	93308	1356.1		.0146	28566	*311.0		*.0146	225667	2219.0		.0102
TOTAL		226660	2710.3		N/A	93308	1356.1		N/A	N/A	N/A		N/A	225667	2219.0		N/A

REMARKS: * Indicates increase in MEGA BTUS and is not included in Project M-202.

ANNISTON ARMY DEPOT - East End | FUEL: Coal | BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	COMP NON BLDG.	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELEC-TRIC	ROOF INSULATION: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELEC-TRIC	WALL INSULATION: PER FT² WALL	DECREASE WINDOW 50%: GLASS AREA	DECREASE WINDOW 50%: MEGA BTUS THERMAL	DECREASE WINDOW 50%: MEGA BTUS ELEC-TRIC	DECREASE WINDOW 50%: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELEC-TRIC	TEMPERATURE CONTROL: PER FT² FLOOR
409	409													55000	112.3		.0021
410	409													27500	44.1		.0011
411	409													42200	180.0		.0041
TOTAL														125000	336.4		N/A

REMARKS:

ANNISTON ARMY DEPOT - East End | FUEL: #2 OIL | BOILER EFFICIENCY: 60%

BLDG. NO.	COMP BLDG	DECREASE IN MEGA BTUS: ROOF INSULATION: ROOF AREA	MEGA BTUS: THERMAL	MEGA BTUS: ELECTRIC	PER FT² ROOF	WALL INSULATION: WALL AREA	MEGA BTUS: THERMAL	MEGA BTUS: ELECTRIC	PER FT² WALL	DECREASE WINDOWS 50%: GLASS AREA	MEGA BTUS: THERMAL	MEGA BTUS: ELECTRIC	PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	MEGA BTUS: THERMAL	MEGA BTUS: ELECTRIC	PER FT² FLOOR
301	301													61806	1071.5		.0173
TOTAL														61806	1071.5		N/A

REMARKS:

ANNISTON ARMY DEPOT - West End FUEL: #2 OIL BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	COMP WITH BLDG.	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: MEGA BTUS PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: MEGA BTUS PER FT² WALL	DECREASE WINDOWS 20%: GLASS AREA	DECREASE WINDOWS 20%: MEGA BTUS THERMAL	DECREASE WINDOWS 20%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 20%: MEGA BTUS PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: MEGA BTUS PER FT² FLOOR
7	7													54332	871.6	1139.6	.0168
TOTALS														54332	873.0	1130.6	N/A

REMARKS:

ANNISTON ARMY DEPOT - West End | FUEL: #2 OIL | BOILER EFFICIENCY: 60%

INCREASE IN MEGA BTUS

BLDG. NO.	COMP RUN BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: PER FT² WALL	INCREASE WINDOWS 50%: GLASS AREA	INCREASE WINDOWS 50%: MEGA BTUS THERMAL	INCREASE WINDOWS 50%: MEGA BTUS ELECTRIC	INCREASE WINDOWS 50%: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: PER FT² FLOOR
142	142									7160	2209.6	815.4	.0220	263768	1679.1	636.6	.0094
TOTAL										7160	2209.6	815.6	N/A	263768	1675.1	636.6	N/A

REMARKS:

ANNISTON ARMY DEPOT - West End | FUEL: #2 Oil | BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	TEMP SUM BY DG	ROOF INSULATION				WALL INSULATION				DECREASE WINDOWS $00				TEMPERATURE CONTROL			
		ROOF AREA	MEGA BTUS			WALL AREA	MEGA BTUS			GLASS AREA	MEGA BTUS			FLOOR AREA	MEGA BTUS		
			THERMAL	ELECTRIC	PER FT² ROOF		THERMAL	ELECTRIC	PER FT² WALL		THERMAL	ELECTRIC	PER FT² GLASS		THERMAL	ELECTRIC	PER FT² FLOOR
33	33									1660	220.1	567.8	.4796	10000	165.8	429.4	.0199
TOTAL										1660	220.1	567.8	N/A	10000	165.8	429.4	N/A

REMARKS:

ANNISTON ARMY DEPOT - Heat Mod   FUEL: Coal   BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	LONG BLDG	ROOF INSULATION: ROOF AREA	ROOF: MEGA BTUS THERMAL	ROOF: MEGA BTUS ELECTRIC	ROOF: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL: MEGA BTUS THERMAL	WALL: MEGA BTUS ELECTRIC	WALL: PER FT² WALL
21	21	16600	425.2		.0255	9097	343.3		.0344
3	21	865	22.2		.0256	515	17.7		.0343
4	21	14923	383.0		.0256	8898	306.2		.0344
5	21	18244	467.5		.0256	10856	374.3		.0344
8	21	1929	49.3		.0256	1163	39.5		.0345
9	21	1920	45.2		.0256	1103	38.5		.0345
10	29	6537	167.5		.0256	3890	134.1		.0344
19	21	1724	44.3		.0255	1027	35.5		.0345
22	21	41176	1026.7		.0256	24502	845.3		.0345
27	21	41136	1054.7		.0256	24502	845.3		.0344
28	21	41176	1054.7		.0256	24502	845.3		.0345
49	21	256	6.5		.0253	152	5.3		.0350
52	21	19234	492.0		.0256	11466	394.0		.0344
TOTAL		205823	5271.3		N/A	122673	4224.6		N/A

BLDG. NO.	DECREASE WINDOWS 50%: GLASS AREA	WINDOWS: MEGA BTUS THERMAL	WINDOWS: MEGA BTUS ELECTRIC	WINDOWS: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMP.: MEGA BTUS THERMAL	TEMP.: MEGA BTUS ELECTRIC	TEMP.: PER FT² FLOOR
21	697	291.5		.4182	16384	293.5		.0179
3	36	15.2		.4213	852	15.1		.0177
4	626	262.7		.4195	14312	255.2		.0178
5	764	320.5		.4195	17974	323.5		.0179
8	80	33.0		.4228	1892	34.0		.0179
9	80	33.0		.4229	1892	34.0		.0179
10	274	114.8		.4190	6448	116.0		.0180
19	72	30.3		.4212	1700	30.7		.0180
22	1726	723.5		.4196	40567	730.2		.0179
27	1726	723.5		.4196	40567	730.2		.0179
28	1724	723.5		.4196	40567	730.2		.0179
49	11	4.5		.4090	252	4.5		.0178
52	805	330.0		.4190	18950	341.2		.0180
TOTAL	8617	3615.6		N/A	202769	3640.3		N/A

REMARKS:

ANNISTON ARMY DEPOT   Heat Kad   FUEL: Coal   BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	CUSP NUM BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: MEGA BTUS PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: MEGA BTUS PER FT² WALL	DECREASE WINDOWS 50%: GLASS AREA	DECREASE WINDOWS 50%: MEGA BTUS THERMAL	DECREASE WINDOWS 50%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 50%: MEGA BTUS PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: MEGA BTUS PER FT² FLOOR
1	1									788	163.8	284.1	.6317	12688	138.1	181.[illegible]	.0211
2	1									598	136.8	237.1	.6337	10536	128.2	160.2	.0211
75	1									368	85.3	147.0	.6316	6567	78.8	99.[illegible]	.0211
220	1									332	77.5	134.0	.6351	5950	72.5	90.5	.0211
221	1									567	131.7	227.7	.6338	10131	123.2	153.8	.0211
S-15	1									292	58.5	101.3	.6368	6500	56.7	68.4	.0211
S-16	1									252	58.5	101.3	.6348	4380	54.2	68.4	.0211
S-47	1									866	288.5	347.8	.6366	15622	107.7	[illegible]	.0211
S-48	1									157	36.5	63.0	.6337	2880	36.2	42.5	.0211
S-49	1									330	74.3	128.7	.6341	5720	68.5	88.3	.0211
S-274	1									253	58.7	101.7	.6339	4518	55.8	67.2	.0211
TOTAL										4665	1082.1	1874.5	N/A	83246	1012.6	1264.9	N/A

REMARKS:

ANNISTON ARMY DEPOT - Restricted Area						FUEL: Coal									BOILER EFFICIENCY: 60%			
		DECREASE IN MEGA BTUS																
		ROOF INSULATION				WALL INSULATION				DECREASE WINDOWS 50%				TEMPERATURE CONTROL				
			MEGA BTUS				MEGA BTUS				MEGA BTUS				MEGA BTUS			
BLDG. NO.	COMP. BLDG	ROOF AREA	THERMAL	ELECTRIC	PER FT² ROOF	WALL AREA	THERMAL	ELECTRIC	PER FT² WALL	GLASS AREA	THERMAL	ELECTRIC	PER FT² GLASS	FLOOR AREA	THERMAL	ELECTRIC	PER FT² STATION	
34	54					3571	90.1	13.1	.0357	575	67.3	26.2	.1626	7694	89.0	32.7	.0131	
58	56					6089	136.0	20.8	.0256	895	117.6	65.5	.1633	12998	130.6	39.0	.0136	
59	54					10088	437.0	57.0	.0356	2738	338.8	124.0	.1633	35659	180.3	106.9	.0136	
65	54					2501	56.6	7.6	.0354	368	42.5	16.3	.1634	4718	50.5	16.2	.0136	
67	54					1870	43.1	5.6	.0356	239	31.6	12.9	.1635	3528	37.3	10.6	.0136	
80	54					2638	59.5	8.8	.0356	379	44.7	17.4	.1630	4960	33.0	14.8	.0136	
171	54					869	10.2	2.6	.0257	133	16.3	5.6	.1631	1600	17.0	4.9	.0136	
172	54					3138	70.7	2.5	.0356	681	65.8	20.7	.1634	5895	62.8	17.2	.0136	
300	54					4968	180.5	14.6	.0356	689	82.3	37.0	.1611	9138	97.1	27.6	.0136	
301	54					7726	178.0	20.3	.0356	1112	131.2	51.8	.1636	16570	155.5	43.7	.0136	
630	54					5465	133.7	17.7	.0356	846	99.5	30.9	.1633	13059	117.0	33.1	.0136	
652	54					5380	120.0	16.0	.0356	768	90.8	35.0	.1633	10000	106.6	30.0	.0136	
654	54					6130	139.6	18.5	.0356	986	156.0	60.5	.1634	11562	123.3	34.7	.0136	
658	54					1329	30.2	4.0	.0356	193	23.4	9.0	.1615	2599	26.8	7.5	.0136	
669	54					1103	26.8	3.5	.0355	171	20.1	7.8	.1631	2236	23.8	6.7	.0136	
670	54					2674	58.2	7.5	.0357	357	42.1	16.6	.1638	4672	49.8	14.0	.0136	
671	54					416	9.3	1.3	.0260	60	7.8	2.7	.1636	789	8.3	2.4	.0137	
675	54					380	6.7	0.8	.0250	42	5.8	1.9	.1642	567	5.8	1.6	.0135	
SUBTOTAL						76381	1737.6	230.8	N/A	11012	1294.9	503.8	N/A	143927	1528.7	431.9	N/A	

REMARKS:

Continued on Next Page

ANNISTON ARMY DEPOT - Restricted Area Continued FUEL, Coal

BOILER EFFICIENCY: 60%

DECREASE IN MEGA BTUS

BLDG. NO.	TEMP SUN BLDG	ROOF INSULATION: ROOF AREA	ROOF INSULATION: MEGA BTUS THERMAL	ROOF INSULATION: MEGA BTUS ELECTRIC	ROOF INSULATION: PER FT² ROOF	WALL INSULATION: WALL AREA	WALL INSULATION: MEGA BTUS THERMAL	WALL INSULATION: MEGA BTUS ELECTRIC	WALL INSULATION: PER FT² WALL	DECREASE WINDOWS 50%: GLASS AREA	DECREASE WINDOWS 50%: MEGA BTUS THERMAL	DECREASE WINDOWS 50%: MEGA BTUS ELECTRIC	DECREASE WINDOWS 50%: PER FT² GLASS	TEMPERATURE CONTROL: FLOOR AREA	TEMPERATURE CONTROL: MEGA BTUS THERMAL	TEMPERATURE CONTROL: MEGA BTUS ELECTRIC	TEMPERATURE CONTROL: PER FT² FLOOR
SUBT.	TAL	FROM FIRST	PAGE			76200	1727.0	230.6	N/A	11012	1294.0	503.6	N/A	161929	1534.7	411.9	N/A
476	58					416	8.5	1.3	.0268	58	7.0	2.7	.1616	701	8.1	2.6	.0137
677	54					524	11.0	1.6	.0238	76	8.8	3.4	.1605	992	10.5	2.9	.0135
600	34					23866	291.8	30.0	.0236	1854	218.2	84.0	.1638	20238	238.6	72.7	.0136
500	38					1536	38.6	6.7	.0256	231	26.0	10.2	.1638	2896	30.0	8.7	.0136
84	58					1781	40.3	5.8	.0256	257	28.3	11.0	.1638	3360	35.8	10.1	.0136
TOTAL						103382	2110.0	282.2	N/A	13600	1585.2	616.7	N/A	176194	1878.7	528.7	N/A

REMARKS:

ANNISTON ARMY AMMUNITION DEPOT - (EAST END)

	BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
		1	2	3	4	5	1	2	3	4	5
0	7,549	236.8	-	-	190.2	195.5	1453.2	-	-	1276.5	1221.2
	TOTALS/	.0311	-	-	.0252	.0259	.1925	-	-	.1691	.1691
4	35,227	778.5	535.5	620.4	-	704.5	3163.4	3163.4	3163.4	-	3163.4
	TOTALS/	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
5	29,732	680.9	-	-	-	327.1	11515.4	-	-	-	10003.8
	TOTALS/	.0229	-	-	-	.0110	.3873	-	-	-	.3365
6	29,317	671.4	-	-	-	322.5	11354.5	-	-	-	9865.2
	TOTALS/	.0229	-	-	-	.0110	.3873	-	-	-	.3365
7	4,291	145.5	89.1	122.3	147.2	118.9	150.8	150.8	150.8	150.8	150.8
	TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
8	30,232	1024.9	628.8	861.6	1037.0	837.6	1118.6	1118.6	1118.6	1118.6	1118.6
	TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
1	13,782	304.6	209.5	278.1	-	275.6	1237.6	1237.6	1237.6	-	1237.6
	TOTALS/	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
2	34,053	752.6	517.6	667.4	-	681.1	3058.0	3058.0	3058.0	-	3058.0
	TOTALS/	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
3	34,053	752.6	517.6	667.4	-	681.1	3058.0	3058.0	3058.0	-	3058.0
	TOTALS/	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
4	48,260	1066.5	733.6	965.9	-	965.2	4333.7	4333.7	4333.7	-	4333.7
	TOTALS/	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898

ANNISTON ARMY AMMUNITION DEPOT - (EAST END)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
2,609	57.7	39.7	51.1	-	52.2	234.3	234.3	234.3	-	234.3
TOTALS/ft^2	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
30,232	1024.9	620.0	861.6	1037.0	837.4	1118.6	1118.6	1118.6	1118.6	1118.6
TOTALS/ft^2	.0339	.020	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
96,330	2132.5	1463.8	1892.7	-	1927.6	8651.0	8651.0	8651.0	-	8651.0
TOTALS/ft^2	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
96,330	2132.5	1463.8	1892.7	-	1927.6	8651.0	8651.0	8651.0	-	8651.0
TOTALS/ft^2	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
96,330	2132.5	1463.8	1892.7	-	1927.6	8651.0	8651.0	8651.0	-	8651.0
TOTALS/ft^2	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
96,330	2132.5	1463.8	1892.7	-	1927.6	8651.0	8651.0	8651.0	-	8651.0
TOTALS/ft^2	.0221	.0152	.0196	-	.0200	.0898	.0898	.0898	-	.0898
8,705	270.5	-	-	219.8	225.5	1675.6	-	-	1471.6	1409.0
TOTALS/ft^2	.0311	-	-	.0252	.0259	.1925	-	-	.1691	.1619
11,291	351.2	-	-	284.5	292.4	2177.5	-	-	1909.3	1828.0
TOTALS/ft^2	.0311	-	-	.0252	.0259	.1925	-	-	.1691	.1619
91,910	3122.2	1908.2	2621.9	3153.0	2542.4	3390.7	3390.7	3390.7	3392.7	3390.7
TOTALS/ft^2	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
3,380	114.6	70.3	96.3	115.9	93.6	125.1	125.1	125.1	125.1	125.1
TOTALS/ft^2	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370

ANNISTON ARMY AMMUNITION DEPOT - (EAST END)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
26,620	902.4	553.7	758.7	913.2	737.4	984.9	984.9	984.9	984.9	984.9
TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
14,010	474.9	291.5	399.3	480.5	388.1	518.4	518.4	518.4	518.4	518.4
TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
255,667	7694.3	4863.2	6084.2	7881.4	6302.4	13113.4	13114.4	13113.4	13113.4	13113.4
TOTALS/	.0301	.0216	.0305	.0349	.0279	.0581	.0581	.0581	.0581	.0581
5,193	176.0	108.0	148.0	178.1	143.8	192.1	192.1	192.1	192.1	192.1
TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
55,060	924.0	-	-	-	846.0	1454.3	-	-	-	1454.3
TOTALS/	.0168	-	-	-	.0154	.0264	-	-	-	.0264
27,588	463.5	-	-	-	424.9	728.3	-	-	-	728.3
TOTALS/	.0168	-	-	-	.0154	.0264	-	-	-	.0264
10,077	341.6	209.6	287.2	345.6	279.1	372.8	372.8	372.8	372.8	372.8
TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
14,400	488.2	299.5	410.4	493.9	398.9	532.8	532.8	532.8	532.8	532.8
TOTALS/	.0339	.0208	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
43,208	725.8	-	-	-	665.3	1140.5	-	-	-	1140.5
TOTALS/	.0168	-	-	-	.0154	.0264	-	-	-	.0264
61,004	3125.5	-	-	-	2402.6	2739.3	-	-	-	2739.3
TOTALS/	.0512	-	-	-	.0407	.0449	-	-	-	.0449

ANNISTON ARMY AMMUNITION DEPOT - (EAST END)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
5,682	176.7	-	-	143.2	147.2	1093.8	-	-	960.8	919.5
TOTALS/	.0311	-	-	.0252	.0259	.1925	-	-	.1691	.1619
5,916	200.6	133.1	169.6	202.9	163.9	218.9	218.9	218.9	218.9	218.9
TOTALS/	.0339	.0200	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
33,694	1142.2	700.8	960.3	1155.7	933.3	1246.7	1246.7	1246.7	1246.7	1246.7
TOTALS/	.0339	.0200	.0285	.0343	.0277	.0370	.0370	.0370	.0370	.0370
TOTALS/										
TOTALS/										
TOTALS/										
TOTALS/										
TOTALS/										
TOTAL /	1,409,194	1,130,066	1,130,066	558,849	1,409,194	1,409,194	1,130,066	1,130,066	558,849	1,409,194
BLDGS.	36,719.9	18,883.4	25,441.5	17,979.8	30,775.5	38,117.3	72,789.8	72,789.8	26,154.1	104,099.
TOTALS/	.0261	.017	.021	.032	.022	.977	.064	.064	.047	.074

ANNISTON ARMY AMMUNITION DEPOT - (WEST END)

	BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
		1	2	3	4	5	1	2	3	4	5
	13,608	567.1	-	-	608.8	416.6	1625.1	-	-	1541.0	1433.8
.	TOTALS/	.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	10,536	423.5	-	-	361.4	346.6	1358.1	-	-	1121.0	1197.9
.	TOTALS/	.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	852	46.6	33.3	36.0	37.5	37.4	228.1	228.1	228.1	228.1	228.1
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	14,732	805.8	576.0	621.7	648.2	646.7	3943.8	3943.8	3943.8	3943.8	3943.8
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	17,974	983.2	702.8	758.5	790.9	789.1	4811.6	4811.6	4811.6	4811.6	4811.6
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	54,332	2066.0	-	-	-	1541.7	9919.4	-	-	-	8780.8
.	TOTALS/	.0380	-	-	-	.0284	.1826	-	-	-	.1618
	1,892	103.5	74.0	79.8	83.2	83.1	506.5	506.5	506.5	506.5	506.5
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	1,892	103.5	74.0	79.8	83.2	83.1	506.5	506.5	506.5	506.5	506.5
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	6,440	352.3	251.8	271.8	283.6	282.7	1724.0	1724.0	1724.0	1724.0	1724.0
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
	1,700	93.0	66.5	71.7	74.8	74.6	455.1	455.1	455.1	455.1	455.1
.	TOTALS/	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677

ANNISTON ARMY AMMUNITION DEPOT - (WEST END)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
16,384	896.1	641.0	691.3	721.2	720.0	4385.3	4385.3	4385.3	4385.3	4385.3
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	[illegible]
40,567	2219.0	1586.2	1711.9	1784.9	1780.9	10859.8	10859.8	10859.8	10859.8	[illegible]
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.26[illegible]
40,567	2219.0	1586.2	1711.9	1784.9	1780.9	10859.8	10859.8	10859.8	10859.8	10859.8
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
40,567	2219.0	1585.2	1711.9	1704.9	1780.9	10859.8	10859.8	10859.9	10859.8	10859.8
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
252	13.8	9.9	10.6	11.1	11.1	67.5	67.5	67.5	67.5	67.5
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
30,000	548.3	-	-	411.4	448.0	7146.8	-	-	6579.0	6717.4
TOTALS/[illegible]	.0183	-	-	.0137	.0150	.2382	-	-	.2193	.2239
18,950	1036.6	740.9	799.7	833.8	831.9	5072.9	5072.9	5072.9	5072.9	5072.9
TOTALS/[illegible]	.0547	.0391	.0422	.0440	.0439	.2677	.2677	.2677	.2677	.2677
6,567	264.0	-	-	212.8	216.1	846.5	-	-	698.7	746.7
TOTALS/[illegible]	.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
5,954	239.4	-	-	192.9	195.9	767.5	-	-	633.5	677.0
TOTALS/[illegible]	.0402	-	-	.0324	.0329	.1289	-	-	.1064	.113.
10,121	406.9	-	-	327.9	333.0	1304.6	-	-	1076.9	1150.8
TOTALS/[illegible]	.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137

ANNISTON ARMY AMMUNITION DEPOT - (WEST END)

	BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
		1	2	3	4	5	1	2	3	4	5
	243,760	8861.6	-	-	7535.8	7854.1	14987.8	-	-	14172.4	14351.2
TOTALS/		.0364	-	-	.0309	.0322	.0615	-	-	.0581	.0589
	12,800	293.1	-	-	-	-	4957.4	-	-	-	-
TOTALS/		.0229	-	-	-	-	.3873	-	-	-	-
	4,500	180.9	-	-	145.8	148.1	580.1	-	-	478.8	511.7
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	4,500	180.9	-	-	145.8	148.1	580.1	-	-	478.8	511.7
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	15,432	620.0	-	-	499.7	507.4	1987.9	-	-	1640.1	1751.5
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	2,800	112.6	-	-	90.7	92.1	360.9	-	-	297.9	318.4
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	5,720	229.9	-	-	185.3	188.2	737.3	-	-	608.6	650.4
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
	4,519	181.6	-	-	146.4	148.6	582.4	-	-	480.7	513.7
TOTALS/		.0402	-	-	.0324	.0329	.1289	-	-	.1064	.1137
TOTAL /		626,907	202,769	202,769	559,775	614,107	626,907	202,769	202,769	559,775	614,107
MBTU		26,446.2	7,928.8	8,556.6	19,571.2	21,681.2	182,822.6	54,204.7	54,280.7	83,888.1	93,603.7
TOTALS/		0.042	0.039	0.0422	0.035	0.035	0.163	0.268	0.268	0.150	0.152

ANNISTON ARMY AMMUNITION DEPOT - (RESTRICTED AREA)

:.	BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
		1	2	3	4	5	1	2	3	4	5
4	7,494	247.5	-	193.3	207.1	199.5	715.9	-	703.8	689.7	691.2
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
8	12,998	428.9	-	335.3	358.7	345.7	1241.3	-	1220.5	1195.8	1202.3
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
9	35,659	1176.7	-	920.6	984.2	948.5	3405.6	-	3348.4	3280.6	3298.5
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
5	4,718	155.7	-	121.7	130.2	125.5	450.6	-	443.0	434.1	436.4
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
7	3,528	116.4	-	91.0	97.4	93.8	336.9	-	331.3	324.6	326.3
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
8	4,960	163.7	-	128.0	136.9	131.9	473.7	-	465.7	456.3	458.8
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
1	1,600	52.8	-	41.3	44.2	42.6	152.8	-	150.2	147.2	148.0
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
2	5,895	194.5	-	152.1	162.7	156.8	563.0	-	553.5	542.1	545.1
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
0	9,134	301.4	-	235.7	252.1	243.0	872.3	-	857.7	840.1	844.9
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
1	14,578	481.1	-	376.2	402.4	387.8	1392.2	-	1368.9	1341.2	1348.5
.	TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925

ANNISTON ARMY AMMUNITION DEPOT - (RESTRICTED AREA)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
11,059	364.9	-	285.3	305.2	294.2	1056.1	-	1038.4	1017.4	1021.0
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
10,000	330.0	-	258.0	276.0	266.0	955.0	-	939.0	920.0	925.0
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
11,562	381.5	-	298.3	319.1	307.5	1104.2	-	1085.7	1063.7	1069.5
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
2,500	82.8	-	64.7	69.2	66.7	238.5	-	235.5	230.7	232.0
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
2,236	73.8	-	57.7	61.7	59.5	213.5	-	210.0	205.7	206.8
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
4,672	154.2	-	120.5	128.9	124.3	446.2	-	438.7	429.8	432.2
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
781	25.8	-	20.1	21.6	20.8	76.6	-	73.3	71.9	72.2
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
547	18.1	-	14.1	15.1	14.6	52.2	-	51.6	50.3	50.6
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
781	25.8	-	20.1	21.6	20.8	74.6	-	73.3	71.9	72.2
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
992	32.7	-	25.6	27.4	26.4	94.7	-	93.1	91.3	91.8
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925

ANNISTON ARMY AMMUNITION DEPOT - (RESTRICTED AREA)

BLDG. SQ. FT.	BLDG. THERMAL ENERGY CONSUMED MBTU YEARLY TOTAL					BLDG. ELECTRICAL ENERGY CONSUMED MBTU YEARLY TOTAL. (MBTU = KWH x 0.0116)				
	1	2	3	4	5	1	2	3	4	5
24,238	799.9	-	625.3	669.8	648.7	2314.7	-	2275.9	2229.9	2242.0
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
2,894	95.5	-	74.7	79.9	77.0	276.4	-	271.7	266.2	267.7
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
3,368	110.9	-	86.7	93.7	89.6	320.9	-	315.5	309.1	310.8
TOTALS/	.0330	-	.0258	.0276	.0266	.0955	-	.0939	.0920	.0925
TOTALS/										
TOTALS/										
TOTALS/										
TOTALS/										
TOTALS/										
TOTAL /	176,194	--	176,194	176,194	176,194	176,194	--	176,194	176,194	176,194
BLDGS.	5,814.7	--	4,545.6	4,863.3	4,687.0	16,828.7	--	16,544.5	16,240.8	16,298.0
TOTALS/	0.0330	--	0.026	0.028	0.027	0.188	--	0.094	0.092	0.093

APPENDIX G

LIST OF REPORTS

LIST OF REPORTS

ENERGY USE SURVEY

Narrative - Volume I, Section 3

Supporting Data - Volume II & III

ENERGY MONITORING AND CONTROL SYSTEMS

Narrative - Volume I, Section 4

Supporting Data - Volume II

BIOMASS SURVEY

Narrative - Volume I, Section 5

Supporting Data - Volume III

CENTRAL BOILER PLANTS

Narrative - Volume I, Section 6

Supporting Data - Volume III

BASEWIDE ENERGY PLAN RECOMMENDATIONS

Narrative - Volume I, Section 7

ECIP PROJECT BROCHURES

Narrative - Volume I, Section 8